

REMARKS

Claim Status

Claims 1-24 were originally presented for examination in this application. In a preliminary amendment filed on May 14, 2004, Applicants added new claims 25-31. A restriction requirement issued on April 25, 2007, and Applicants elected claims 1-21 and 25-31 in response thereto. An office action issued on August 24, 2007, in which all pending claims were rejected, and an amendment and response was filed in which certain claim amendments were presented to overcome the rejects. A final office action issued on April 14, 2008, upholding the rejections, and a subsequent response was filed on May 29, 2008. A subsequent office action issued on July 11, 2008, again rejecting all pending claims, and a response was filed on November 4, 2008. An office action was then issued on January 26, 2009, in which the claims were again rejected, and a response was filed on May 20, 2009. A final office action issued on August 21, 2009, again rejecting the claims, and a response and request for continued examination was filed on December 3, 2009. An office action has now issued in which:

- Claims 1-2, 4-9, 12-13, 15-16, 19, 25-26 and 29 were rejected under 35 U.S.C. §103(a) as being obvious in light of a paper by Olson et al. entitled “Moving Object Detection and Event Recognition Algorithms for Smart Cameras” (“Olson”) in view of U.S. Patent No. 6,570,608 to Tserng (“Tserng”) and in further view of U.S. Patent No. 5,845,009 to Marks et al. (“Marks”).
- Claims 10, 11, 17, 18, 20, 27, 28 and 30 were rejected under 35 U.S.C. §103(a) as being obvious in light of Olson and Tserng and further in view of U.S. Patent No. 5,845,009 to Marks et al. (“Marks”) and U.S. Patent No. 6,371,805 to Brodsky et al. (“Brodsky”).
- Claims 14, 21 and 31 were rejected under 35 U.S.C. §103(a) as being obvious in light of Olson, Tserng and Marks and further in view of U.S. Patent No. 6,441,846 to Carlstrom et al. (“Carlstrom”).

In this response, Applicants have amended claims 1, 15, and 17-21 to address these rejections. No new matter has been added.

Examiner Interview

Applicants would like to thank Examiner Czekaj for his time regarding the pending application during the telephonic interview of April 8, 2010. The following is intended to constitute a proper recordation of the interview in accordance with M.P.E.P. §713.04.

Claim Rejections Under 35 U.S.C. §103(a)

Independent claims 1, 15 and 19

Independent claims 1, 15 and 19 each recite using video frames generated “over time” to “concurrently” track objects “with respect to a monitored environment” as they traverse the environment in a manner that is “independent of calibration among the image sensors and the monitored environment.” Critically, the tracking of the objects as they “move between fields-of-view” is based on a probability that one of the objects in a first video frame generated by one image sensor at a first time corresponds to an object in a second video frame generated by a second image sensor at a second point in time.

In the most recent Office action, the Examiner cited the “probability matrices” of Marks in rejecting claim 3. These matrices do not represent the probabilities that an object will appear in a particular video frame after being identified in another frame, as claimed. Marks, generally, is directed to identifying “an object in an image.”¹ More specifically, Marks’ technique comprises two phases – a “modeling procedure” and a “tracking procedure.”² The modeling procedure “creates models of the object that can be used to later locate the object in the tracking image.”³ Of critical importance is that the object (singular) is being tracked in the tracking image (again, singular). Essentially, the modeling process of Marks creates “a statistical model of the head” and a “statistical model of the torso” as input for the tracking phase.⁴ In the tracking phase, the object is tracked in the image, which facilitates “controlling of the video camera in response to the location of object within the tracking images.”⁵ (emphasis added).

¹ Marks, Abstract.

² Marks, column 3, lines 51-52.

³ Marks, column 4, lines 3-5.

⁴ Marks, column 4, lines 26-30.

⁵ Marks, column 4, lines 46-48.

Marks does describe using “a series of probability matrices” – but the values in the matrices represent probabilities “that the object is present at various locations *within the tracking image*.⁶ (emphasis added). In effect, the Marks system identifies an object of interest within a single image, and each location in the matrix represents pixel locations in the image. The probabilities referred to by Marks are simply the likelihood that an object is at a particular pixel location in the image – not a probability that two objects viewed in different images as seen by different cameras at different times are, in fact, the same object.

In contrast, the claims recite tracking objects among multiple cameras using probabilities that represent the likelihood an object will appear within a video frame generated by another camera after the object (or objects) have been captured by a first camera. By way of example, consider a person leaving a room in which a surveillance camera has been installed and having two exits, each exit leading into separate hallways, in which additional cameras have been installed. Further, one of the exits is a door into an often-used hallway, whereas the other door leads to a rarely-used fire escape.

In this manner, the system determines, by tracking objects over time, that the probability a person exited the room into the hallway is 95%, and into the fire escape is 5%, for example. Therefore, when the individual leaves the field-of-view of the room camera, the system can “guess” (correctly, in most instances) that the next camera on which they will appear is the hallway camera, even if, as may be the case in certain situations, the fields-of-view of the two cameras do not overlap. Such information may be used, for example, to provide selected video feeds to surveillance personnel, or initiate recordings of activities based on a likely event or movements without having to monitor or activate numerous cameras. Using Marks’ system, in contrast, the user is tracked as he moves about the field-of-view of the single room camera, but once he leaves, there is no way of knowing (or even inferring) in which camera’s field-of-view he will appear on next. Marks’s probability matrices identify certain objects as being the same objects seen in previous frames based on pixel locations within the image, but ultimately always by the same camera. Because the Marks system does not have the claimed probabilistic feature, it cannot provide such functionality.

⁶ Marks, column 5, lines 40-45.

Independent claims 17, 18 and 20

Independent claims 17 and 20 recite applying the monitoring and tracking techniques of claims 1 and 15 in a particular environments but still include the distinguishing limitations of claims 1 and 15 described above. The Examiner has cited Brodsky for the limited purpose of illustrating that surveillance may be performed in parking lots, and as such, Brodsky does not cure the deficiencies of Marks.

Independent claim 21

Independent claim 21 recites applying the monitoring and tracking techniques of claims 1 and 15 in a particular environment but still includes the distinguishing limitations of claims 1 and 15 described above. The Examiner has cited Carlbom for the limited purpose of illustrating that surveillance may be performed retail establishments, and as such, Carlbom does not cure the deficiencies of Marks.

Thus, because none of the cited references teach or suggest every element of independent claims 1, 15, 17, 18, 19, 20 and 21, Applicants respectfully submit that these references, either alone or in combination, fail to anticipate or render these claims obvious. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 15, 17, 18, 19, 20 and 21 under 35 U.S.C. §103(a), as well as those claims that depend directly or indirectly therefrom.

CONCLUSION

Applicants respectfully requests allowance of claims 1,2, 4-21 and 25-31 in due course. The Examiner is invited to contact Applicants' undersigned representative by telephone at the number listed below to discuss any outstanding issues.

Respectfully submitted,

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